



Introduction

- Clinically significant tricuspid regurgitation (TR) is common especially in patients with structural heart disease.
- Moderate to severe TR is independently associated with poor clinical outcomes.
- Surgical interventions for TR are associated with high mortality and rarely performed for isolated TR.
- Several transcatheter interventions for tricuspid valve repair are under investigation and can be categorized into 1) edge-to-edge repair, 2) transcatheter annuloplasty, 3) spacer devices and 4) bioprosthetic valves.
- This metanalysis is aimed to summarize the and safety transcatheter efficacy of interventions.

Method

- Following PRISMA guidelines and according to the Cochrane Handbook for Systematic Reviews of Interventions, we searched PubMed, Scopus, Web of Science, and Cochrane CENTRAL for all prospective clinical registries and trials published until April 2020.
- We performed the analysis of continuous outcomes using the mean difference (MD) while used the risk ratio (RR) for analysis of dichotomous outcomes.
- We included the following outcomes: Tricuspid Annular Plane Systolic Excursion (TAPSE), Vena Contracta (VC), Tricuspid Annulus Diameter (TAD), Tricuspid Regurgitation Volume (TRV), Left Ventricular Ejection Fraction (LVEF), six minutes walking test, bleeding, stroke, and mortality rates.

Study or Subgroup 1.9.1 CAVI Dreger2020 taramasso2018 CAVI Subtotal (95% CI) Test for overall effect: Z = 0.55 (P = 0.58

1.9.2 MitraClip Lurz2018 nickenig2017 Nickenig2019 (2) taramasso2018 MitraClip Test for overall effect: Z = 1.96 (P = 0.05)

1.9.3 CardioBan nickenig2019 taramasso2018 Trialigr taramasso2018 tricinch Subtotal (95% CI)

Total (95% CI) Test for overall effect: Z = 2.40 (P = 0.02) Test for subgroup differences: $Chi^2 = 2.93$, df = 2 (P = 0.23), $l^2 = 31.6\%$

Study or Subgroup asmarats2019 besler2018 Lurz2018 nickenig2017 nickenig2019 Nickenig2019 (2) perlman2017 rommel2019

Total (95% Cl Test for overall effect: Z = 11.38 (P < 0.00001)

Study or Subgroup 1.4.2 Annuloplasty nickenig2019 taramasso2018 c taramasso2018 T taramasso2018 tr Subtotal (95% CI) Heterogeneity: Tau Test for overall effe

1.4.3 Valve Clips Lurz2018 Nickenig2019 (2) taramasso2018 M Subtotal (95% CI) Heterogeneity: Tau Test for overall effe

1.4.4 FORMA asmarats2019 taramasso2018 F Subtotal (95% CI) Heterogeneity: Tau Test for overall effe

Total (95% CI) Heterogeneity: Tau^a Test for overall effect

Promises of Transcatheter Tricuspid Valve Interventions in Patients with Clinically Significant Tricuspid Regurgitation: A Meta-Analysis

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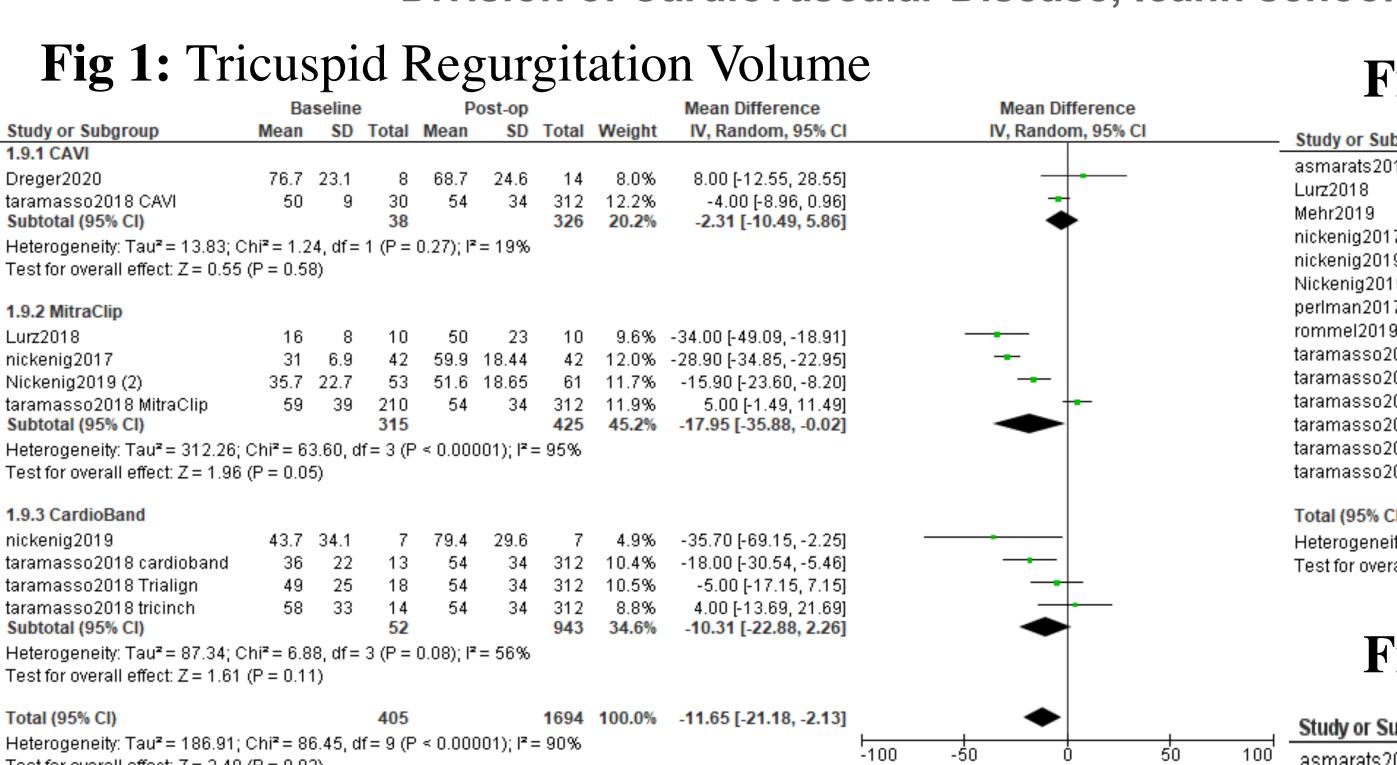


Fig 2: Vena Contracta

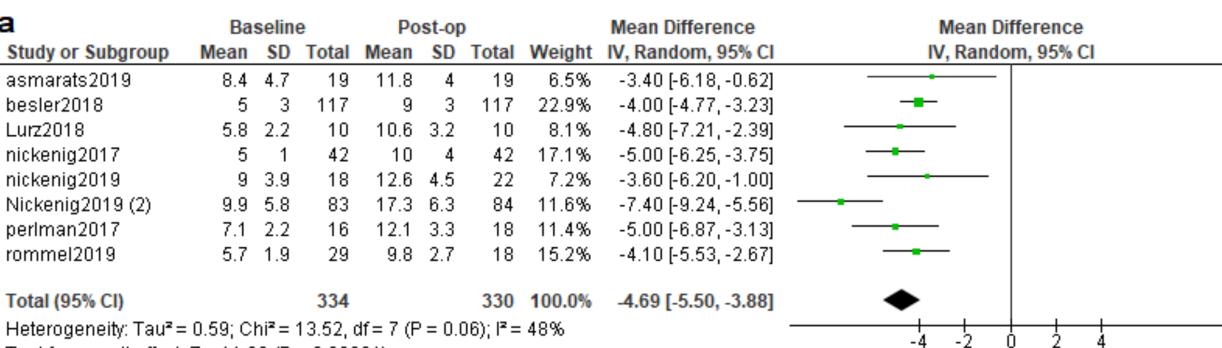


Fig 3: Tricuspid Annulus Diameter

										_ .
	Baseline			Post-op			Mean Difference		Mean Difference	
up	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI	Study o
ty										asmara
	37.8	3.3	18	42.2	0.5	18	25.7%	-4.40 [-5.94, -2.86]		besler2
cardioband	44	5	13	46.9	9	312	9.8%	-2.90 [-5.80, -0.00]		nickenig
Trialign	52	22	18	46.9	9	312	0.9%	5.10 [-5.11, 15.31]		orban2(
tricinch	56	6	14	46.9	9	312		Not estimable		perimar
)			49			642	36.5%	-3.29 [-5.85, -0.73]	◆	
au ^z = 2.38; Ch	ii = 3.85	5, df =	2 (P =	0.15); P	²= 48	%				Total (9
ffect: Z = 2.52	(P = 0.0)	1)								Heterog
										Test for
	46	6	10	54	5	10	3.9%	-8.00 [-12.84, -3.16]	-	
)	40.6	5.5	81	43.3	5.9	82	21.7%	-2.70 [-4.45, -0.95]		
MitraClip	43	9	210	46.9	9	312	25.0%	-3.90 [-5.47, -2.33]		
)			301			404	50.6%	-3.91 [-5.81, -2.00]	-	
au ^z = 1.44; Ch		•	2 (P =	0.11); P	²= 54	%				
ffect: Z = 4.02	(P < 0.0	001)								1.
										2.
		~ ~	4.0			4.0				3.
	43		19	46.1		19	5.5%	-3.10 [-7.12, 0.92]		4.
FORMA	42.7	5.2	16 35	45.7	4.8	18 37	7.5% 12.9%	-3.00 [-6.38, 0.38]		5.
)) df_		0.075.8	2_ 00		12.9%	-3.04 [-5.63, -0.46]		Ca
au² = 0.00; Ch ffoot: 7 = 2.24		•	Г (P =	0.97), r	-= 0%	0				6.
ffect: Z = 2.31	(P = 0.0	2)								W
			385			1083	100.0%	-3.64 [-4.61, -2.66]	▲	7. 8.
au² = 0.35; Ch	1 2 − 0 6 3	e الم		0.207-18	2-10		100.070	-0104 [-1101] -2100]	······································	
fect: Z = 7.30		•	•	0.23),1	- 10	<i>,</i> 0			-10 -5 0 5 10	10
nett. 2 – 7.30 n difforoncoc	1			D - N 96	3 IZ-	n%	Favours [Post-op] Favours [Baseline]	11		

.30 (P < 0.00001) Test for subaroup differences: $Chi^2 = 0.32$, df = 2 (P = 0.85), $l^2 = 0\%$ taramasso2 taramasso2 taramasso2 taramasso2 Total (95% 0

asmarats2 besler2018 Dreger2020 Lurz2018 Mehr2019 nickenig20 Nickenig20 perlman20 rommel201 taramasso2

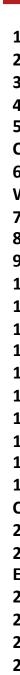
Favours [baseline] Favours [post-op]

Favours [Post-op] Favours [Baseline]

taramasso2 taramasso2 taramasso2 taramassoi taramasso2 Total (95%

Heterogeneity: $Chi^2 = 12.60$, dt = 14 (P = 0.56); r = 0.56Test for overall effect: Z = 0.39 (P = 0.70)

2020 an2017 (95% CI)



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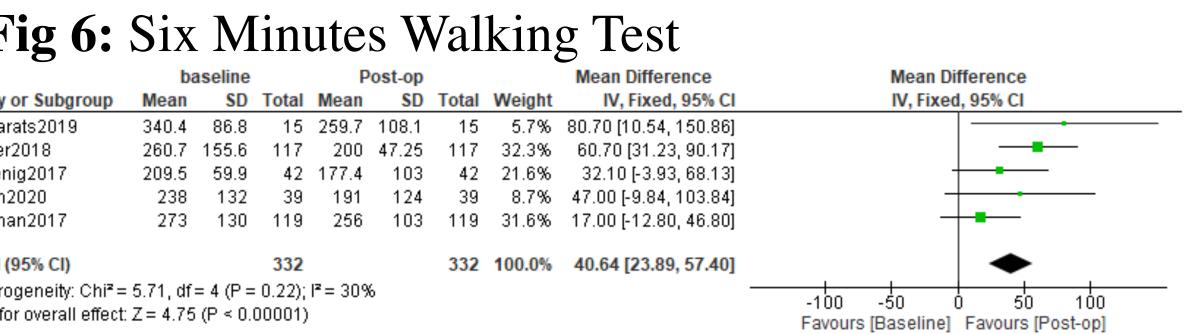
Fig 4: Left Ventricular Ejection Fraction

ubgroup Mean SD Total Mean SD Total Weight IV, Fixed, 959 019 58 7.8 19 60 9 19 3.6% -2.00 [-7.36, 3	i li
010 58 78 10 60 0 10 2.6% -2.00L7.26.2	361
53 13 10 56 12 10 0.9% -3.00[-13.97, 7.	.97]
49.6 14.1 157 49 14 249 13.0% 0.60 [-2.21, 3	.41] —
17 51.4 12 42 50.6 11.4 42 4.1% 0.80 [-4.21, 5	.81]
19 57.7 8 22 57.2 10.5 22 3.4% 0.50 [-5.02, 6	.02]
)19 (2) 60.05 7.47 83 59.4 8.09 73 17.1% 0.65 [-1.80, 3	.10] —
17 61 9 16 59 9 18 2.8% 2.00 [-4.06, 8	.06]
19 52.4 10.8 18 52 12.6 18 1.7% 0.40 [-7.27, 8	.07]
2018 cardioband 52 5 13 49 13 312 10.9% 3.00 (-0.08, 6	.08]
2018 CAVI 52 9 30 49 13 312 8.3% 3.00 [-0.53, 6	.53]
2018 FORMA 53 11 24 49 13 312 4.8% 4.00 [-0.63, 8	.63]
2018 MitraClip 49 13 210 49 13 312 19.9% 0.00 [-2.27, 2	.27]
2018 Trialign 53 10 18 49 13 312 4.4% 4.00 [-0.84, 8	.84]
2018 tricinch 55 8 14 49 13 312 5.2% 6.00 [1.57, 10	.43]
CI) 676 2323 100.0% 1.46 [0.45, 2.	.47]
eity: Chi² = 12.83, df = 13 (P = 0.46); l² = 0%	
erall effect: Z = 2.82 (P = 0.005)	Favours [Baseline] Favours [Post-op]

Fig 5: Tricuspid Annular Plane Systolic Excursion

C	Ba	selin	е	Post-op				Mean Difference	Mean Difference	
Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Fixed, 95% Cl	IV, Fixed, 95% Cl	
2019	15.3	4.6	19	14.8	4.8	19	1.5%	0.50 [-2.49, 3.49]		
8	16.1	4.5	117	16.3	5.2	117	8.6%	-0.20 [-1.45, 1.05]		
20	16.1	5.2	14	15	4.8	8	0.7%	1.10 [-3.20, 5.40]		
	16	3	10	17	4	10	1.4%	-1.00 [-4.10, 2.10]		
	15.8	4.3	249	15.9	4.3	140	16.9%	-0.10 [-0.99, 0.79]		
017	16.6	5.2	42	17.3	6.8	42	2.0%	-0.70 [-3.29, 1.89]		
019 (2)	14.4	3.1	79	14.9	3.1	79	14.3%	-0.50 [-1.47, 0.47]		
017	14.7	5.4	18	13.5	3.1	16	1.6%	1.20 [-1.72, 4.12]		
19	16.1	4.8	18	16.5	4.5	18	1.4%	-0.40 [-3.44, 2.64]		
02018 cardioband	16.2	5	312	15	3	13	4.5%	1.20 [-0.52, 2.92]		
02018 CAVI	16.2	5	312	15	3	30	9.2%	1.20 [-0.01, 2.41]		
02018 FORMA	16.2	5	312	15	4	24	4.7%	1.20 [-0.49, 2.89]		
o2018 MitraClip	16.2	5	312	16	4	210	22.3%	0.20 [-0.57, 0.97]	_ _	
o2018 Trialign	16.2	5	312	17	3	18	6.0%	-0.80 [-2.29, 0.69]		
o2018 tricinch	16.2	5	312	17	3	14	4.8%	-0.80 [-2.47, 0.87]		
i CI)			2438			758	100.0%	0.07 [-0.29, 0.44]	•	
neity: Chi ² = 12.60, d	f=14 (P	= 0.5	56); ² =	0%						
erall effect: 7 = 0.39			-,1.						-4 -2 0 2 4	

Fig 6: Six Minutes Walking Test



References

Favours [Baseline] Favours [Post-op]

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Results

- We included fourteen clinical registries/trials with a total of 1329 patients.
- Transcatheter tricuspid interventions led to lower TRV (MD = -11.68, p=0.02)[Fig 1], smaller VC (MD = -4.69, p=0.005)[Fig 2] and TAD (MD = -3.78mm, p<0.001)[Fig 3], and improved LVEF (MD = 1.46%, p=0.005) [Fig 4]. No significant difference was noted regarding TAPSE (MD=0.07mm, p=0.7)[Fig 5].
- Patients could walk 41 more meters after the intervention (MD = 40.64, p<0.001) [Fig 6].
- Pooled mortality rate was 8.2%, stroke 1%, and bleeding 5% during the mean 12 months follow up.

Conclusion

- Transcatheter tricuspid valve repair devices be effective interventions in prove to decreasing regurgitation and improving functional capacity in patients with clinically significant TR.
- Mortality rate is significantly higher in patients with unsuccessful interventions and to underlying be related to seems cardiovascular disease.